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EXAMINER

STEELMAN, MARY J

ART UNIT	PAPER NUMBER
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2191

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/998,035

Applicant(s)

KAMEN ET AL.

Examiner

Mary J. Steelman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to RCE, Amendments and Remarks received 07/06/2005. Per Applicant's request claims 1, 2, 11, 13, 14, 15, 23, and 25-27 have been amended. Claims 1-27 are pending.

Claim Objections

2. Examiner believes the 'Currently Amended' status identifier of claim 22 should be --Previously Amended--. For examination purposes, claim 22 will be examined as if the status identifier recited 'Previously Amended.'

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4-10, 13-22, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,321,240 B1 to Chilimbi et al., in view of US Patent 6,098,064 to Pirolli et al.

Per claim 1:

A method for transparently optimizing data access, comprising:

(Chilimbi: Abstract, lines 1-3, "Fields which are individually addressable data elements in data structures are reordered to improve the efficiency (optimizing)...", col. 1, lines 12-15, "This

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invention relates generally to the field of computer memory management and in particular to optimizing cache utilization by modifying data structures.”, col. 20, lines 11-30, “...method..., col. 19, line 66- col. 20, line 1, “...technique reduces cache miss rates...and improves program performance...as compared to the commonly used alternative.”)

-gathering information related to data usage when a system is processing...;

(Chilimbi: Col. 2, lines 37-38, “The partitioning is based on profile information about field access counts (data usage)”, col. 16, lines 63-66, “The design and implementation of a low-overhead, real-time (when system is processing) data access (data usage) profiler...”)

Chilimbi disclosed that his invention may be practiced in distributed computing environments (col. 4, lines 28-29), but failed to provide specific details regarding “using a client runtime” when gathering information. Chilimbi disclosed, col. 2, lines 37-38, “The partitioning is based on profile information (gathered usage patterns) about field access accounts”, but failed to provide specific details regarding “determining a usage pattern of the system using gathered information.”

However Pirolli disclosed (col. 4, lines 13-14) “The prefetch and cache module (hereinafter the P&C module) (a client runtime: as defined by the Specification, it gathers information and generates usage patterns)” Col. 6, lines 17-25: The P&C module waits for a command, a document request by a **client**. (emphasis added) Col. 6, lines 57-58: The fetched document is added to the ‘document needs list’ and a recording in the (col. 6, line 62-63) history data

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structure of a document data structure is entered. (client runtime / gathers information and generates usage patterns) See Figs. 6 & 7. Col. 10, lines 14-16, "...the needs list is sorted by highest need probability (determining a usage pattern of the system using gathered information)...those documents with the greatest probability of being needed by the user are located at the top of the list..." Col. 10, lines 21-23, "...the P&C module proceeds to fill cache with those documents having the highest need probability in the sorted needs list. Thus the P&C module is a 'client runtime'. It gathers information and generates usage patterns, are used with a cache policy to optimize data accesses.

Chilimbi failed to provide details regarding "wherein the usage pattern specifies at least one of a plurality of persistent objects and at least one of a plurality of attributes within the at least one of the plurality of persistent objects used by the system."

However, Pirolli disclosed (col. 6, lines 50-61) a document (object) requested by a client is added to a 'needs list' according to a calculated (col. 5, lines 16-17) 'needs probability' (gathering data usage / determining usage pattern). Adding the entry (specifies persistent objects) to the 'needs list' includes recording the document's name (attribute within persistent object) and source (i.e., URL) (attribute within persistent object) in field of the document data structure.

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Chilimbi's invention which optimized cache utilization by including the

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teachings of Pirolli, which more specifically detail how information is gathered and processed to determine usage patterns of the system, because both inventions are concerned with improving (Chilimbi: col. 1, lines 51-53) (Pirolli: col. 1, lines 26-27) the performance / speed of delivery of data. Pirolli provided more specific details.

Per claim 2:

Chilimbi failed to provide specific details related to limitations of claim 2, however Pirolli disclosed:

-pre-fetching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects specified in the usage pattern of the system;

(Pirolli: Col. 10, lines 21-23, “the P&C module proceeds to fill cache (pre-fetch) with those documents having the highest need probability in the sorted needs list (needs list of persistent object and attributes within persistent object / specified in the usage pattern of the system).”)

-caching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects locally in a cache associated with the system;

(Pirolli: See FIGs. 2 & 3, #202 P&C module and #208 cache – Prefetch module cache associated with the system. Also see FIGs. 6-8, specifically #811, Prefetch and Cache Document & related text at col. 6, line 17-col. 11)

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-accessing the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects from the cache;

(Pirolli: See FIG. 3, Client computers #102 access data from the cache, #202)

-synchronizing the cache with a persistent data store, wherein the persistent data store stores the plurality of persistent objects.

(Pirolli: See FIG. 6, #606 – Is The Document Current?, No?, #610 Fetch Document from Web Server. As an example of synchronizing the cache with a persistent data store, col. 6, lines 45-50, discloses using a local document if it is current, else replacing it with a fetched document (URL address / persistent data store) to keep the cache synchronized.)

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Chilimbi's invention which optimized cache utilization by including the teachings of Pirolli, which more specifically detail using a policy to cache locally, permitting clients to access the cache and maintaining synchronization for an optimal system, because both inventions are concerned with improving (Chilimbi: col. 1, lines 51-53) (Pirolli: col. 1, lines 26-27) the performance / speed of delivery of data. Pirolli provided more specific details.

Per claim 4:

-generating tests for the system by retaining the usage pattern over a period of at least one execution of the system.

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(Chilimbi: Col. 10, lines 7-17, "...while running the application...a data element...is tracked...A constraint on reordering this element may then be associated with that data element during a second run...(using retained usage patterns)")

Per claim 5:

-usage pattern comprises pieces of information used together based on a relationship.

(Chilimbi: Col. 4, lines 7-9, "...division of a class into two classes comprising hot access fields and cold access fields with an added level of indirection to the class containing cold access fields..." Information gathered into hot classes have the relationship of being frequently accessed.)

Per claim 6:

-the relationship is temporal.

(Chilimbi: Col. 6, lines 30-37, "This results in a high temporal access affinity...", col. 6. line 50, "...derive desired temporal affinities.")

Per claim 7:

-the relationship is causal.

(Chilimbi: Col 6, lines 51-54, "A trace may also be used to collect temporally correlated reference data (causal relationship) if desired by tracing all memory references and using a sliding time window to identify references to each other...")

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Per claim 8:

-deriving an initial usage pattern from application code analysis.

(Chilimbi: Col. 6, lines 60-65, "Static program analysis (initial usage patterns)... Such analysis can range from...tools written to analyze program data structure usage.", col. 10, lines 18-19, "...statically analyzing...")

Per claim 9:

-deriving an initial usage pattern from an empty set.

(Chilimbi: Col. 6, lines 66-67, "A field affinity graph is constructed by bbcache as shown in FIG. 3." An empty set is used for the first profiling.)

Per claim 10:

-deriving an initial usage pattern from a specification of the system.

(Chilimbi: Col. 10, lines 7-17, "...A constraint on reordering this element may then be associated with that data element during a second run through the layout process (specification)...")

Per claim 13:

A method for transparently optimizing data access, comprising:

-gathering information related to data usage when a system is processing using a client runtime;

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- determining a usage pattern of the system using gathered information, wherein the usage pattern specifies at least one of a plurality of persistent objects and at least one of a plurality of attributes within the at least one of the plurality of persistent objects used by the system;
- pre-fetching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects specified in the usage pattern of the system;
- caching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects locally in a cache associated with the system;
- accessing the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects from the cache;
- synchronizing the cache with a persistent data store, wherein the persistent data store stores the plurality of persistent objects.

(See limitations addressed in the rejection of claims 1 & 2 above.)

Per claim 14:

A method for transparently optimizing a distributed application having a client-side and a server-side, comprising:

(Chilimbi: Col. 5, lines 19-23, "Personal computer may operate in a networked environment...Remote computer may be...a server, a router...", col. 5, lines 29-31, "Such networking environments are commonplace in offices, enterprise-wide computer networks...")

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- gathering information related to data usage on the client-side when the distributed application is processing using a client runtime;
- determining a usage pattern using gathered information, wherein the usage pattern specifies at least one of a plurality of persistent objects and at least one of a plurality of attributes within the at least one of the plurality of persistent objects used by the client-side.

(Chilimbi suggests that his invention is suitable for a (col. 4, lines 28-29) a distributed computing environments where tasks are performed by remote processing devices linked (server-side & client-side). The limitations for gathering information related to data usage and determining a usage pattern are addressed in claim 1 above.)

Per claim 15:

- pre-fetching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects from the server-side using the usage pattern and a server runtime;
- caching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects of the client-side in a cache associated with the client-side;
- accessing the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects on the client-side using the cache;

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-synchronizing the cache data on the client-side with persistent data store on the server-side, wherein the persistent data store stores the plurality of persistent objects.

(See limitations addressed in the rejection of claim 2 above.)

Additionally, Pirolli disclosed, col. 11, lines 18-19, "The method set forth above for prefetching and caching documents at a client computer (client-side)..."

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify Chilimbi's invention which optimized cache utilization by including the teachings of Pirolli, which more specifically detail using a policy to cache locally, permitting clients to access the cache and maintaining synchronization for an optimal system, because both inventions are concerned with improving (Chilimbi: col. 1, lines 51-53) (Pirolli: col. 1, lines 26-27) the performance / speed of delivery of data. Pirolli provided more specific details.

Per claim 16:

-the usage pattern comprises pieces of information used together based on a relationship.

(See limitations addressed in the rejection of claim 5 above.)

Per claim 17:

-the relationship is temporal.

(See limitations addressed in the rejection of claim 6 above.)

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Per claim 18:

-the relationship is causal.

(See limitations addressed in the rejection of claim 7 above.)

Per claim 19:

-the data represents objects.

(Chilimbi: Col. 5, lines 60-62, "The notion of an object is exploited in the present invention in that certain aspects of the invention are implemented as objects in one embodiment.", col. 17, lines 8-9, "Profiling can be implemented at object, not filed, granularity.")

Per claim 20:

-deriving an initial usage pattern from application code analysis.

(See limitations addressed in the rejection of claim 8 above.)

Per claim 21:

-deriving an initial usage pattern from an empty set.

(See limitations addressed in the rejection of claim 9 above.)

Per claim 22:

-deriving an initial usage pattern from a specification of the system.

(See limitations addressed in the rejection of claim 10 above.)

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Per claim 25:

A method for transparently optimizing a distributed application having a client-side and a server-side, comprising:

- gathering information related to data usage on the client-side when the distributed application is processing using a client runtime;
- determining a usage pattern using gathered information, wherein the usage pattern specifies at least one of a plurality of persistent objects and at least one of a plurality of attributes within the at least one of the plurality of persistent objects used by the client-side;
- pre-fetching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects from the server-side using the usage pattern and a server runtime;
- caching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects on the client-side in a cache associated with the client-side;
- accessing the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects on the client-side using the cache;
- synchronizing the cache on the client-side with the persistent data store on the server-side, wherein the persistent data store stores the plurality of persistent objects.

(See limitations addressed in the rejection of claims 14 and 15 above.)

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Per claim 26:

A computer-readable medium having recorded thereon instructions executable by processing, the instructions for:

(Chilimbi: Col. 20, lines 31-54, "...computer readable medium...")

- gathering information related to data usage when a system is processing using a client runtime;
- determining a usage pattern of the system using gathered information, wherein the usage pattern specifies at least one of a plurality of persistent objects and at least one of a plurality of attributes within the at least one of the plurality of persistent objects used by the system;
- pre-fetching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects specified in the usage pattern of the system;
- caching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects locally in a cache associated with the system;
- accessing the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects from the cache;
- synchronizing the cache with a persistent data store, wherein the persistent data store stores the plurality of persistent objects.

(See limitations addressed in the rejection of claims 1 and 2 above.)

Per claim 27:

An apparatus for transparently optimizing data access, comprising:

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(Chilimbi: Col. 20, lines 55-67, "A computer system (apparatus)...")

-means for gathering information related to data usage when a system is processing using a client runtime;

-means for determining a usage pattern of the system using gathered information, wherein the usage pattern specifies at least one of a plurality of persistent objects and at least one of a plurality of attributes within the at least one of the plurality of persistent objects used by the system;

-means for pre-fetching the at least one of plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects specified in the usage pattern of the system;

-means for caching the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects locally in a cache associated with the system;

-means for accessing the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects from the cache;

-means for synchronizing the cache with a persistent data store, wherein the persistent data store stores the plurality of persistent objects.

(See limitations addressed in the rejection of claims 1 and 2 above.)

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,321,240 B1 to Chilimbi et al., in view of US Patent 6,098,064 to Pirololi et al, and further in view of US Patent 6,700,590 B1 to DeMesa et al.

Per claim 3:

Chilimbi disclosed (col. 10, lines 7-17), “by retaining the usage pattern over a period of at least one execution of the system”. The application is tracked while running, resulting in a new layout and the application is run again.

Although Chilimbi / Pirolli disclosed that an invention suitable for a business process (Chilimbi: col. 5, lines 19-31), “Such networking environments are commonplace in offices, enterprise-wide computer networks...”, Chilimbi / Pirolli failed to disclose “generating a description of a business process model”. However, DeMesa disclosed (col. 2, lines 21-34), a view model to collect and display data from multiple sources. “The data that is collected and displayed by the system may, for example, include...time series data. The system also preferably includes development tools...and views to generate a model of a business entity.

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to modify the Chilimbi/ Pirolli invention to include the generation of a business entity, as Chilimbi did disclose that his invention was suitable for a business environment, and generating business models is a typical use of information gathered from profiling.

6. Claims 11, 12, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,321,240 B1 to Chilimbi et al., in view of US Patent 6098064 to Pirolli, and further in view of US Patent 6,430,741 B1 to Mattson, Jr. et al.

Per claims 11 and 23:

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Regarding the limitations:

-displaying the at least one of the plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects specified in the usage pattern on a display device.

Chilimbi / Pirolli disclosed plurality of persistent objects and at least one of the plurality of attributes within the at least one of the plurality of persistent objects specified in the usage pattern (see rejection of claim 1 above). Chilimbi / Pirolli failed to disclose ‘displaying’ ... on a ‘display device.’

However, Mattson disclosed a system and method for data coverage (optimizing data access) analysis, including display and documentation. Col. 3, lines 31-36, “...coverage information is read from the merged file using a visualization tool which **displays** the number of times each element in the data table has been accessed...”, col. 6, lines 31-33, “The coverage information is then fed to the visualization tool which produces a **visually demonstrative display** of the coverage information.” (emphasis added)

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to have included the display and documentation features in the Chilimbi / Pirolli invention, as they are logical, well known techniques for providing information gathered from profiling and presenting the information to a developer. Displaying optimization data is well known in the art.

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Per claims 12 and 24:

Chilimbi / Pirolli disclosed a technique for optimizing data access in a system, gathering a usage pattern. Chilimbi / Pirolli failed to disclose “generating documentation from the usage pattern.”

However, Mattson disclosed a system and method for data coverage (optimizing data access) analysis, including display and documentation. Col. 3, lines 31-36, “...coverage information is read from the merged file using a visualization tool which displays the number of times each element in the data table has been accessed...”, col. 6, lines 31-33, “The coverage information is then fed to the visualization tool which produces a visually demonstrative display of the coverage information.”, col. 7, lines 59-63, “...data coverage tables are created to store information relating to data coverage...termination code is added to the program. The termination code writes the coverage information to a file for later examination (documentation).”

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of the invention, to have included the display and documentation features in the Chilimbi / Pirolli invention, as they are logical, well known techniques for providing information gathered from profiling and presenting the information to a developer. Displaying optimization data is well known in the art.

Response to Arguments

7. Applicant has argued, in substance, the following:

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(A) As Applicant has noted on page 9, last paragraph of Remarks received 6 July 2005, regarding independent claims 1, 13, 14, and 25-27, "Chilimbi does not teach or suggest gathering information related to data usage when a system is processing using a client runtime."

Examiner's Response: Chilimbi disclosed gathering information (profile information about field access counts) related to data usage when a system is processing (real time data access) at col. 16, lines 63-66. See rejection of claim 1 above. Chilimbi suggested that the invention may be practiced in distributed computing environments, col. 4, lines 28-29. More specifically Pirolli provided a reference to the 'client runtime' when gathering information. A document request by a client will be analyzed for addition to the 'needs list', sorted by highest need probability. See rejection of claim 1 above.

(B) As Applicant has noted on page 10, 2nd paragraph of Remarks, regarding independent claims 1, 13, 14, and 25-27, Pirolli does not teach 'creating a usage pattern that specifies particular persistent objects and specific attributes within the persistent objects.' Pirolli does not teach 'gathering information that may be used to determine a usage pattern.'

Examiner's Response: The Pirolli reference has been added to supply more specific details. Pirolli generates / creates a usage pattern using information from the history of accesses. Pirolli discloses (col. 6, lines 50-61) gathering usage pattern information (used to determine a usage pattern) into a 'needs list', adding a new entry (specifies particular persistent object) as needed including the name and source / URL (attributes within persistent object).

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Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Steelman, whose telephone number is (571) 272-3704. The examiner can normally be reached Monday through Thursday, from 7:00 AM to 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached at (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary Steelman



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